THE

AMERICAN JOURNAL

OF THE MEDICAL SCIENCES.

MARCH, 1894.

REPORT OF FOUR CASES OF BRAIN SURGERY.[1]

By Andrew J. McCosh, M.D.,
VISITING SURGEON, PRESBYTERIAN HOSPITAL, NEW YORK; PROFESSOR OF SURGERY, NEW YORK POLYCLINIC.

The localization of cerebral functions has in recent years become so accurate that it was naturally thought that much progress would be at once made in the surgical treatment of epilepsy. This anticipation, however, has not been realized; indeed, the treatment of this disease by operative measures is attended by results, as far as cure is concerned, but little better than those which were obtained a score or more of years ago. It must be confessed that the great advances made in cerebral localization have thrown but little light upon the nature or treatment of epilepsy. While it is true that certain cases of Jacksonian epilepsy have been permanently cured by operation, yet we must acknowledge that operations for the cure of true idiopathic epilepsy have been discouraging.

Experimentation on animals has thrown but little light upon the matter, and it is probable that most of our accurate knowledge must be derived from the observations of the pathologist and of the surgeon. On this account it is important that all cases which are related directly or indirectly to this subject should be reported. Individual cases which, while interesting, may not at the time of their report afford suggestions for the formation of general rules for diagnosis and treatment, will eventually, by comparison with similar cases, lead to inductions which will be of the greatest value.

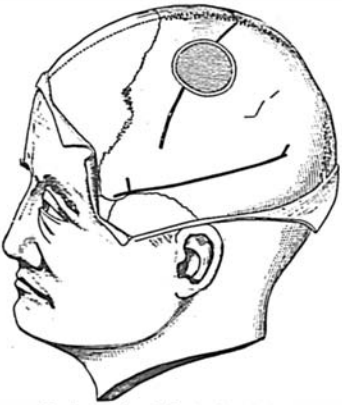
---

[1] Read at the Pan-American Medical Congress, in Surgical Section.

Each one of the following cases contains some point of special interest:

CASE I. *Extra-dural hemorrhage; convulsions; operation; recovery.*—Male, aged eighteen years. On July 29, 1889, patient was found lying on the bottom of a trench in a semi-comatose condition. He had been in good health up to the previous night, when it was supposed that, while under the influence of liquor, he had fallen into the trench, which was six feet deep. The accident must have occurred after midnight, and he was brought to the Presbyterian Hospital at 8 A.M. On his admission he was very stupid, but could be aroused so that he gave his name, but not his address. Temperature, 100; pulse, 76. The scalp was contused in the occipital region, but there was no sign of fracture or hæmatoma. The pupils were symmetrical, and there was no paralysis. For twenty-four hours the patient showed the general symptoms of cerebral irritation (laceration)—lying on his side, with thighs drawn up, in a half-stupid state; he could be aroused by an effort, and would utter a peevish, irritable cry, jerk his arms, roll over on the opposite side, and lapse again into slumber. He refused all nourishment. His urine was drawn by catheter. At the end of twenty-four hours he became brighter, began to look about him, and drank his milk. By the fourth day there was marked improvement; he talked intelligently and asked questions, but his memory was deficient. By the eighth day (August 5th) he seemed almost natural, except for slight restlessness and occasional lapse of memory. His eyes were normal, and there was no paralysis. On the evening of this day slight twitching of the right foot and leg was noticed. On the ninth day this twitching was more noticeable, and in the evening it had extended to the right hand. There appeared to be no paralysis.

FIG. 1.



Case I. Location of clot, 2 x 2½ x ¾ inches.

During the night he had an epileptic convulsion, beginning in the right foot and becoming general, followed by stupidity lasting half an hour.

On the morning of the tenth day (August 7th) another very short convulsion occurred. I decided in the afternoon to operate, and to expose the lower and posterior part of the motor area of the left side, as the symptoms indicated pressure at this point. The diagnosis was pressure by a blood-clot. On shaving the head no contusion or laceration of the scalp was found. By dissecting up a semicircular scalp flap the bone was exposed over the fissure of Rolando. There was no evidence of fracture or injury of the skull. With a three-quarter-inch trephine a button of bone was removed from over the centre of the fissure of Rolando. Immediately underneath a blood-clot was found, extending downward and backward. The opening in the skull was enlarged in this direction, following the clot until an opening two by two and a half inches was made. The clot was then removed in two or three pieces. It was oval in shape, three-quarters of an inch thick at the centre, and thinning out toward the edges.

The surface of the dura mater under the clot was roughened, but was not lacerated or apparently injured in any way. It was not opened. A director was swept around between the skull and dura, but no additional clot or sign of fracture could be discovered. The bone was not replaced. The scalp flap was replaced and sutured. The patient was returned to his bed at 4 P.M., and rapidly recovered from the anæsthesia. At 7 P.M. there was a slight convulsion, limited to the right leg and hand. No further manifestation of cerebral irritation showed itself, and the patient made a rapid and uneventful convalescence. He has been perfectly well ever since, earns his living as a bricklayer, and does not hesitate to go on an occasional spree.

CASE II. *Extra-dural hemorrhage; convulsions and paralysis; trephining; recovery.*—Boy, aged six years. On August 11, 1890, the patient fell down stairs and was supposed to have struck his head. He was unconscious when picked up and remained partially unconscious until admitted to the Presbyterian Hospital twenty hours later. For forty-eight hours after admission he lay quietly on his right side with thighs and arms flexed, and was apparently unconscious unless when disturbed, when he became irritable and restless, uttering sharp, peevish cries and pushing away his nourishment. Temperature ranged between 100° and 102°; pulse, 110 to 120. Pupils were equal and reacted. There was no sign of paralysis. The scalp was contused over the right temporal region. On the fourth day he became brighter, was less irritable, answered questions in a semi-rational manner, and drank his milk when told to do so.

On August 17th, the sixth day from the date of the injury, his general mental condition was very much improved; he talked intelligently, asked for food, and seemed quite happy. It was noticed, however, that sensation in the left arm and leg did not seem so acute as on the other side; there was no impairment of motion.

On the next day (seventh), in the morning, he had a distinct convulsion, limited to the left upper extremity, lasting one minute, and followed by an apathetic state for half an hour. In the afternoon another convulsion occurred, beginning in the left side of face and left forearm, and then involving the entire left upper extremity. Sensation was markedly diminished in the left arm and leg. The left upper and lower extremities toward evening were completely paralyzed. There was left-sided facial paralysis. During the night two similar convulsions occurred.

On August 19th (eighth day) the boy had two convulsions, beginning in the left hand and foot and involving the left upper and lower extremity and left side of face. His mental condition remained bright. No disturbance of sight, taste, or smell could be discovered. The eyes were normal. Complete paralysis of left upper and lower extremity persisted. Temperature, 100°; pulse, 90. The diagnosis was made of blood-clot pressing on the motor area for left arm, leg, and face; and, after consultation with Dr. W. G. Thompson, immediate operation was decided on. The contused scalp had recovered, and there was no external sign of injury. After anæsthetization a semilunar scalp flap was dissected free, and the skull exposed over the fissure of Rolando. The bone was bared over a space two and a half by three inches, but no sign of injury was found. With a three-quarter-inch trephine a button of bone was removed at a point over the fissure of Rolando, two and a half inches from the median line. On removal of the button, in the anterior half of the circle the dura appeared normal; but in the posterior inferior quadrant it was concealed by a blood-clot. The clot extended downward and backward, and the opening in the skull was enlarged by rongeur forceps in this direction until it measured two and a half inches in the antero-posterior direction and two inches from above downward. It was then seen that a fissure of the skull ran into the posterior part of the opening. On enlarging the scalp flap it was perceived that this fissure ran from above downward and slightly forward, and at its upper extremity was joined by another fissure which ran from below upward and forward. The portion of bone between the two fissures was triangular in shape, the apex one and one-half inches from the median line. This triangle of bone attached at the base was one and one-half inches long. It was cut away, and under it was found brain tissue deprived of the dura and somewhat lacerated. The rent in the dura was one and one-half inches long, and the edges having receded left bare an area of brain corresponding to the triangle of bone removed. The clot, which in the meantime had been removed, was oval in shape, two and a half by three inches, and about one-half inch thick at its centre. The cavity was irrigated with boro-salicylic solution, the scalp flap returned and sutured except at the lower posterior angle, where a rubber drain was inserted. No attempt was made to suture the rent in the dura, as it was found impossible to approximate the edges, and the brain tissue at this point appeared to be superficially disintegrated. The patient recovered quickly from the anæsthetic, and in his struggles he moved decidedly, though feebly, the left hand and forearm, which had been absolutely paralyzed before the operation, and which had lain limp and motionless when he was fighting vigorously with his right hand and arm at the commencement of anæsthetization. This ability to move the left arm remained only for a short time, and then for the next twelve hours the paralysis appeared as complete as before the operation. He remained, however, bright mentally, and there were no convulsions; indeed, after the operation not a single convulsive movement occurred. At the end of twenty-four hours he could move his left arm with distinct force, and very feebly his left foot. Sensation remained sluggish.

On the fourth day after operation there was a marked improvement in his muscular power. There was a discharge of broken-down brain tissue through the tube, and apparently a tendency to hernia cerebri.

On August 26th (seventh day) this had ceased, and the paralysis of sensation and motion had almost disappeared. At the end of two weeks the boy was out of bed, without sign of paralysis. He has been in good health ever since; he has attended school, is bright at his lessons, and entirely free from pain, convulsive movements, or paralysis of either sensation or motion.

CASE III. *Trephining; drainage of lateral ventricle; recovery.*—Male, aged twenty-nine years, florist; gives a history of occasional attacks of unconsciousness ever since he was twelve years of age. He describes them as beginning with a sudden pain in the cardiac region, followed by tumultuous beating of his heart and ending in syncope or unconsciousness, which lasted for a few seconds and left him weak and exhausted. Convulsive movements had never been noticed. These attacks were very infrequent, sometimes two and three years intervening between them. The patient had always been of a nervous and excitable temperament, and from the history it was doubtful if the attacks were true epilepsy. His general health had been fairly good up to the time of an accident, which occurred on October 29, 1892. On that day, while carrying a stove down stairs, he was pushed from behind and precipitated to the foot of the stairs. He was stunned for a minute or so, but did not lose consciousness. A short time afterward, on account of the hemorrhage from a scalp wound, he was brought to the Presbyterian Hospital. On admission (October 29, 1892) two scalp wounds were found in the occipital region, each about two inches long. There was an extravasation of blood in the left eye and hemorrhage from the left ear. He was unable to raise his left arm. For the next few days he was very stupid. He would answer questions, but unless aroused he took no notice of his surroundings. His temperature ranged between 99½° and 100½°. The paralysis of the left arm gradually disappeared, and mentally he became brighter, though complaining of severe headache. By November 10th the paralysis had entirely disappeared, and though somewhat stupid and dazed, he was allowed to sit up. While sitting at the side of the bed in a chair he had a general convulsion, lasting ten minutes, followed by an apathetic condition for a couple of hours afterward, and by slight anæsthesia of the left arm. For the following two weeks he complained of headache and dizziness, but his mental state gradually improved. He had no further convulsive movements until December 3d, when a general convulsion occurred lasting two minutes. It was followed by complete anæsthesia of his left arm and leg and hyperæsthesia of the right side and marked tenderness of the cicatrix in the right occipital region. The reflexes were absent on the left side, and exaggerated on the right side, where there was also marked ankle clonus. On the following day these symptoms still persisted, and in addition partial loss of power of his left hand was noticed and extreme sensitiveness of his right eye to light. Gradual improvement took place, and in forty-eight hours more these signs had entirely disappeared. He was still, however, stupid and at times excitable, but on December 7th he felt well enough to leave the hospital, though strongly urged not to do so. He remained at home for nearly a month, during which time he had two convulsions. Immediately after his second convulsion, January 4, 1893, he was brought into the medical side of the hospital in an extremely excitable and yet somewhat dazed condition. Temperature 101°, pulse 100.

January 5. A general convulsion, lasting six minutes.

11*th*. A general convulsion.

17*th*. A general convulsion.

18*th*. Two general convulsions.

From the 17th to the 25th a general convulsion occurred every morning and often a second one at night. The convulsions lasted from three to ten minutes, and were very violent. There was no regularity in the muscles which were first affected. His mental state continued to grow worse; his memory was entirely lost; at times he lay in a stupid, almost semi-comatose state, and at times was excited and delirious. He complained of pain in the back of his head, and the slightest pressure on the occipital cicatrix caused him to cry out with pain. His temperature ranged between 99° and 100½°; pulse between 85 and 100. After January 25th he became steadily worse, the convulsions became more frequent, averaging five in the twenty-four hours; his stupor increased and he became quite irrational, sometimes for an hour or so remaining in a state of semi-coma, and then again becoming very restless and noisy. On January 28th, Dr. A. H. Smith, the attending physician, felt that unless relief could be derived from operation he could not live more than a week or two, and on the next day he was transferred to my service on the surgical side. In the meantime he had been examined by a number of neurologists and surgeons, and most of their diagnoses inclined toward syphilitic gumma or general paresis. Operative interference was, in the opinion of all of them, contra-indicated. Dr. Smith, however, sent him to me in the hope that he might be benefited. He remained under observation for three days more, during which time his symptoms remained very much the same, with the exception that his temperature ranged between 100° and 101°, and his pulse increased in frequency (110). He was at no time rational, lying for part of the time in a semi-comatose state, and then again became excited and delirious, imagining himself persecuted and making violent efforts to get out of bed. He was very hyperæsthetic over his whole body, but especially so on the back of his head and most markedly at the seat of the cicatrix in the right occipital region. His eyes were normal. His tendon reflexes were greatly exaggerated. As he was daily losing ground, both physically and mentally, I decided, on January 31st, to do an exploratory trephining.

He was anæsthetized with chloroform, and a semicircular scalp flap was raised, the cicatrix being in its centre. This cicatrix, which was situated just above the middle of the superior curved line of the right side, was found adherent to the bone. On exposing the bone a roughening and what seemed to be a stellate cicatrix was found. At this point, which was just above the lateral sinus, with a one-inch trephine a button of bone was removed. The inner surface of the button was roughened, but the elevations were smooth and comparatively slight, and certainly could have produced no depression of either the dura mater or brain. The dura was found thickened and roughened over an area three-quarters of an inch square, being perhaps twice its normal thickness. By rongeur forceps the opening was enlarged, mainly upward and inward. A flap of dura was raised. No evidences of clot were found, and the pia mater looked normal. There was evidently, however, a great of moisture on the pad, which absorbed all the ventricle fluid, it was estimated that between one and two ounces had escaped. This estimate, however, is unreliable, and the amount may have been much greater.

After the third day (February 3d) the patient improved rapidly. There had been no signs of convulsive movements since the operation, and he remained entirely free from even twitching of the muscles during his convalescence. At the end of a week he was quite bright and cheerful, talked intelligently, asked for food, was entirely free from delirium or delusions, and had perfect control of himself. The reflexes seemed to have returned to their normal state, the hyperæsthesia had disappeared, there was no sign of paralysis, and he was able to read his bedside notes. His eyes were examined and proved normal. His memory was still defective, and he complained of occasional headache. At the end of two weeks the patient was out of bed, bright, and cheerful. At the end of a month (March 1st) he was apparently well, and made himself very useful in the work of the ward. His memory of events during the past year was defective, but otherwise he seemed perfectly well. On one or two occasions, after excitement, he complained of headache, but otherwise had no pain. On March 24th, after an exciting interview with some of his friends, he had some twitching of the muscles of the face and hands, but no distinct convulsion. On March 28th he went out on a pass and was brought back by ambulance, in a very stupid state, evidently caused by alcohol. On April 3d he left the hospital, commenced drinking, and in the evening was carried to another hospital in a condition of semi-coma. Alcoholic intoxication was, however, evidently the cause of his mental state, as a day later he resumed work. He has reported to me within a week, seven months after operation. He has been at work for the past five months, and has not missed a single day. His health is perfect, he looks bright and happy, and his employers report that he is perfectly intelligent and trustworthy, and that his memory is good. He has no headache and no tenderness of the cicatrix. He has been intoxicated more than once without bad consequences. Indeed, up to the present time he is perfectly cured and there seems to be every prospect that the cure will be permanent.[1]

There can be no doubt that the operation saved this patient. It is difficult to name the disease or lesions which caused his grave symptoms. It is possible that the cicatrix in the dura was the cause of the accumulation of intra-cranial fluid. In many ways his symptoms resemble those of the disease which has been described under the name of meningitis serosa.

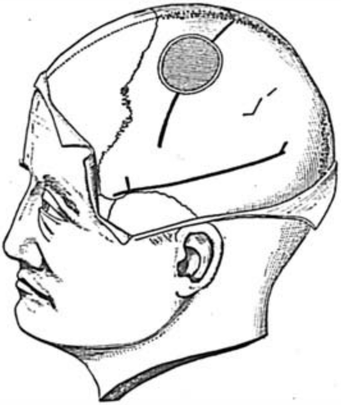
CASE IV. *Sub-dural organized clot; epilepsy; trephining.*—Female, aged six and one-half years; was kindly referred to me by Dr. M. A. Starr. The family history is good with the exception of the maternal grandmother, who was an epileptic. The mother reports that the child's health has been good with the exception of the fits. She states that at the age of one and a half years the child had a series of convulsions coming on suddenly without apparent cause, and lasting several hours. As a result, there was a partial paralysis of the right arm and leg, which persisted for several weeks and then disappeared. The next convulsion occurred at the age of four years, and one fit followed another for two or three hours, and resulted in weakness of the right hand, which lasted for a few days only. During the next six months she was perfectly well. At four and a half years, there was another convulsion, without resulting paralysis, and at five years another severe convulsion, since which time she has remained partially paralyzed in her right arm and leg. For nearly a year no further convulsions occurred, though the paresis remained.

---

[1] January 16, 1891. The patient at the expiration of eleven and a half months from time of operation continues bright and intelligent, and no convulsions have occurred.

For six months previous to her entrance into the hospital (since September, 1892) she has had what the mother calls "spasms," in which the head turned always to the right, and convulsive twitching of the right hand and occasionally of the right foot followed. For the first four months, when she was without treatment, these averaged ten in the twenty-four hours; since treatment has been carried out, the average number has been four or five. On examination there was marked atrophy of the muscles of the right arm and forearm. She had very little use of the right upper extremity, especially of the hand. At times there was marked rigidity of the muscles of the hand and forearm, the fingers and thumb being flexed and tightly clenched in the palm. The circulation of the hand was impaired. Occasionally she could hold a large object in her right hand, but as a rule she was unable to take hold of any article. At times athetoid movements were present. There was slight atrophy of the muscles of the right leg and foot, and a distinct dropping of the toes (hemiplegic gait). Mentally the child is bright, though very bashful; eyes normal and general nourishment

FIG. 3.



Case IV. Location of organized blood-clot.

good. Dr. Starr had made the diagnosis of pressure on the motor area for the right arm and leg, and sent her to me for operation. He advised an opening to be made over the arm centre, and accordingly, after reflection of a scalp flap, with a one-inch trephine, a button of bone was removed over the fissure of Rolando, about one and a half to two inches to the left of the median line. On removal of the bone, the dura was found to have been adherent to its under surface. By rongeur forceps the opening in the skull was enlarged downward and forward to double its original size. The dura seemed to pulsate less vigorously than usual. It was incised along the upper border of the opening and a flap turned downward. As the dura was reflected, its under surface was seen to be rougher than normal, and lying on the top of the pia mater was seen a translucent, reddish membrane. This membrane, which was about the thickness of a sheet of note paper, covered the area of brain exposed and extended beyond. It was lifted up and removed, but there remained a border which extended beyond the opening in the skull for about three-fourths of an inch, except at its lower part. This was afterward removed by a small spoon from under the dura, the patient's head being elevated.

So-called œdema of the pia was marked, the membrane being lifted off the brain by a layer of fluid nearly half an inch deep. The pia was incised between the veins in two or three places, and several drachms of fluid oozed out. As the fluid escaped it was seen that this part of the brain was depressed, as if the convolutions were atrophied. The brain on palpation appeared normal and there was no justification for further exploration. The flap of dura was replaced and sutured, as was also the scalp flap. The bone was not returned.

The child recovered quickly from the operation and showed very little shock. For three weeks following there was no special change for the worse or the better. The convulsions continued as before, as did the paralysis. It is now five months since the operation. The child has gained considerably in weight and appears brighter, but the convulsions have not been modified by the operation; they occur as frequently, and their character is the same. A slight improvement, however, has taken place in the paralyzed muscles; the child walks with less of a limp, and she can now grasp objects with her paralyzed hand. The muscles are still weak and lack proper co-ordination, but there is undoubtedly an improvement. I should consider the prognosis bad as far as the convulsions are concerned, but I should expect a further improvement of the paralysis. The membrane removed was undoubtedly an organized blood-clot, and the most probable cause of the hemorrhage was a pachymeningitis hæmorrhagica.[1]

---

[1] January 16, 1891. During the past four months the progress of the case has been most interesting. In the beginning of October the convulsions became more frequent, averaging from twelve to eighteen in the twenty-four hours. The patient was again admitted to the hospital for the purpose of inserting gold foil between the dura and brain. The child, however, had slight fever, and in a few days it was evident that she had typhoid fever. The case was rather severe and protracted. The remarkable fact about it was, however, that from the time the disease was well established not a single convulsion occurred. The child has now been well for about two months, and during this time she has been entirely free from any convulsive movements. She has grown considerably, and the partially atrophied muscles of her right arm and leg seem to be fuller and stronger, though a certain amount of paralysis still persists.

Within the last few months I have trephined three other patients for epilepsy. All have recovered from the operation, but it is as yet too soon to report on the results. The mere removal of a button of bone from the skull seems to improve nearly all epileptics for a few months, and it is rather misleading to report on the condition of these patients before sufficient time has elapsed for the disappearance of the amelioration which may be attributed to the operation *per se*.

THE EARLY DIAGNOSIS AND PRACTICAL SURGERY OF CANCER.

By Herbert Snow, M.D. Lond., etc.,
Surgeon to the Cancer Hospital, London.

That a considerable proportion of the cases operated on for malignant disease fail to secure their due measure of success, simply for want of timely recognition, is, to the practical surgeon, a mere truism. The obstinate tendency of "cancer" to "recur" was of old explained by a supposed "constitutional origin." Modern science more correctly attributes this to the infective and autositic properties of the cells concerned, with the early transmission of nuclear fragments by blood or lymph currents to other parts than that primarily attacked. Hence the vital necessity for a prompt diagnosis, in localities amenable to the resources of surgery, of actual or potential malignancy, before this transmission has had time to take place, or at least to proceed very far.

To recognize a malignant growth in its later stages is always easy; to gauge with accuracy its real nature from the early inception of the disease-process is often extremely difficult. Yet a fairly confident idea of the state of the case may generally be acquired by due regard to certain *a priori* probabilities, in addition to the physical signs proper to each individual instance. Thus, malignant lesions are specially prone to attack degenerating organs and degenerating people. With the exception of a numerically small congenital group of tumors, which I have elsewhere classified under a special term, *Blastoma*, and which mostly differ from ordinary cancer in arising spontaneously, malignant new-growths are almost entirely restricted to women above the age of thirty-four, to men past forty. Further, they appear in organs which have fulfilled their functional purpose and are undergoing devolution, as now effete appendages, *e. g.*, the sexual organs of women; or else in tissues whose vitality has become conspicuously impaired, such as the buccal mucous tract of men. Hence we are bound to look with grave suspicion upon any incipient tumor-formation in these parts of the respective